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Page : 7 of 15

Attorney's Docket No.: 100110275-1
Amendment dated June 28, 2007
Reply to Office action dated March 28, 2007

Amendments to the Drawings

The attached Appendix contains replacement and annotated sheets of drawings that include the following changes to FIG. 9: the label " \hat{A}'_{IL} " has been has been changed to -- \hat{A}'_{IH} --.

Appendix: Replacement Sheet
 Annotated Sheet Showing Changes

Remarks

I. Status of claims

Claims 1-18 were pending.

Claims 19-22 have been added.

The Examiner has indicated that claims 7-9 and 16-18 would be allowable if rewritten in independent form including all the elements of the base claim and any intervening claims.

II. Request for information

In the Office action dated March 28, 2007, the Examiner made the following request for information:

Applicant and the assignee of this application are required under 37 CFR § 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

1. In response to this requirement, please provide the title, citation and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to (1) switching between high and low resolution images (see fig. 3) and (2) generating high frequency component of the estimated high-resolution image by performing motion compensation (see fig. 9). For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.
2. In response to this requirement, please provide the title, citation and copy of each publication that any of the applicants relied upon to draft the claimed subject matter. For each publication, please provide a concise explanation of the reliance placed on that publication in distinguishing the claimed subject matter from the prior art.

MPEP § 704.11 provides that (emphasis added):

There must be a reasonable basis for the information required that would aid in the examination of an application or treatment of some matter. A requirement for information under 37 CFR 1.105 places a substantial burden on the applicant that is to be minimized by clearly focusing the reason for the requirement and the scope of the expected response. Thus, the scope of the

requirement should be narrowly defined, and a requirement under 37 CFR 1.105 may only be made when the examiner has a reasonable basis for requiring information.

The criteria stated in 37 CFR 1.105 for making a requirement for information is that the information be reasonably necessary to the examination or treatment of a matter in an application. The information required would typically be that necessary for finding prior art or for resolving an issue arising from the results of the search for art or from analysis of the application file.

...

The criteria of reasonable necessity is generally met, e.g., where:

- (A) the examiner's search and preliminary analysis demonstrates that the claimed subject matter cannot be adequately searched by class or keyword among patents and typical sources of non-patent literature, or
- (B) either the application file or the lack of relevant prior art found in the examiner's search justifies asking the applicant if he or she has information that would be relevant to the patentability determination.

In this regard, the Examiner has failed to make any showing whatsoever that his request for "each publication that any of the applicants relied upon to draft the claimed subject matter" is reasonably necessary to the examination or treatment of a matter in the present application, much less any showing that meets the criteria described in paragraphs (A) or (B) above. Indeed, the fact that such a showing cannot be made is evidenced by the relevant prior art that the Examiner has cited in his rejections of the claims (i.e., the fact that the Examiner was able to locate the cited prior art demonstrates that that the claimed subject matter can be adequately searched).

For the reasons explained above, there is no reasonable basis for the Examiner's request and therefore, contrary to the Examiner's assertion, a response to the Examiner's request is not required under 37 CFR § 1.105.

It is noted that, the Examiner's request for "each publication that any of the applicants relied upon to draft the claimed subject matter" is not narrowly defined, as required under MPEP § 704.11.

III. Information Disclosure Statement

Applicant requests that the Examiner consider the references listed on the forms PTO/SB/08A and PTO/SB/08B that are being filed herewith and return with the next correspondence initialed copies of these forms to indicate that all of the cited references have been considered.

IV. Claim rejections under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claims 1, 2, and 10 under 35 U.S.C. § 112, second paragraph, "as being indefinite."

Applicant believes that the usage of the verb "mapping" in claim 1 is not indefinite. In the context of the invention defined in claim 1, one skilled in the art at the time the invention was made would understand that "mapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame" clearly and unambiguously means transforming the high spatial frequency component into a motion-compensated high spatial frequency component estimate of the low resolution image frame.

Similarly, Applicant believes that the usage of the verb "remapping" in claim 10 is not indefinite. In the context of the invention defined in claim 1, one skilled in the art at the time the invention was made would understand that "remapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame" clearly and unambiguously means transforming the high spatial frequency component into a motion-compensated high spatial frequency component estimate of the low resolution image frame.

Claim 2 has been amended in a way that renders moot the Examiner's concerns under 35 U.S.C. § 112, second paragraph.

V. Claim rejections under 35 U.S.C. § 103

A. Claims 1, 3-5, 10, and 12-14

The Examiner has rejected claims 1, 3-5, 10, and 12-14 under 35 U.S.C. § 103(a) over Parke (U.S. 5,025,394) in view of Turner (U.S. 6,198,505).

1. Claim 1

In support of the rejection of independent claim 1, the Examiner has stated that (emphasis added):

Regarding claim 1, Parke discloses the following claim limitations:

A system for reconstructing a high resolution image (i.e. high resolution output) from at least one image sequence of temporally related high (i.e. 220) and low (i.e. 210) resolution image frames, each of said high resolution image frames including a low spatial frequency component and a high spatial frequency component [fig. 2; col. 5, ll. 5-10], said system comprising: a [first spatial interpolator] adapted to generate a low spatial frequency (i.e. 211) component from a low resolution image frame (i.e. 210) of said at least one image sequence [fig. 2; col. 4, ll. 47-61]; a [high spatial frequency component generator] for generating a high spatial frequency (i.e. 221) component from at least one high resolution image frame (i.e. 220) of said at least one image sequence, said at least one high resolution image frame being closely related to said low resolution image frame [fig. 2, col. 5, ll. 1-10]; an [adder] (i.e. 230) for adding said ~~motion-compensated~~ high spatial frequency component estimate (i.e. temporally interpolated high resolution frames, which have been high pass filtered) of said low resolution image frame to said generated low spatial frequency component (i.e. spatially interpolated low resolution images, which have been low pass filtered) of said low resolution image frame to form a reconstructed high resolution image (i.e. high resolution output) of said low resolution image frame [fig. 2; col. 6, ll. 40-55].

Contrary to the Examiner's statement, however, Parke does not disclose "a first spatial interpolator adapted to generate a low spatial frequency component from a low resolution image frame of said at least one image sequence" and "a high spatial frequency component generator for generating a high spatial frequency component from at least one high resolution image frame of said at least one image sequence." In particular, Parke teaches that the low resolution frames and the high resolution frames are produced from the same set of high resolution video frames (see col. 4, lines 13-42, especially lines 35-38; FIG.

2). One skilled in the art at the time the invention was made would have understood from Parke's reference to the video frames as "high resolution video" (see col. 4, line 38) that these video frames have the same (i.e., high) spatial resolution.

Turner does not make-up for the failure of Parke to disclose "a first spatial interpolator adapted to generate a low spatial frequency component from a low resolution image frame of said at least one image sequence" and "a high spatial frequency component generator for generating a high spatial frequency component from at least one high resolution image frame of said at least one image sequence." Indeed, Turner's camera does not generate low spatial frequency components from the motion frames that are output from the high speed imager 34; Turner's camera simply processes the motion frames to produce motion vector fields that are used for predicting the intermediate frames that are interpolated between two successive truth frames (see col. 3, lines 61-64, col. 4, lines 25-38, and col. 4, lines 60-67). Turner's camera also does not generate high spatial frequency components from the high resolution truth frames; instead, Turner's camera simply interpolates between successive truth frames to produce the intermediate frames (see col. 3, lines 61-64, col. 4, lines 25-38, and col. 4, lines 60-67).

Thus, the proposed combination of Parke and Turner does not disclose or suggest all the limitations of the claimed invention. For at least this reason, the rejection of independent claim 1 under 35 U.S.C. § 103(a) should be withdrawn.

The rejection of claim 1 under 35 U.S.C. § 103(a) over Parke in view of Turner also should be withdrawn for the following additional reason.

The Examiner has acknowledged that Parke does not disclose "a remapper for mapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame," as recited in claim 1.

The Examiner has relied on Turner in an effort to make-up for this failure of Parke's teachings. In particular, the Examiner has stated that:

However, in the same field of endeavor Turner discloses the deficient claim limitations, as follows:

A remapper for mapping a high resolution image to generate a motion-compensated (i.e. move pixels based on motion vector) high resolution image [col. 4, ll. 60-67; col. 5, ll. 14-23].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify Parke's temporal interpolation to include motion compensation as taught by Turner's temporal interpolation, the motivation being to generate images of a moving scene [col. 1, ll. 56-60).

Contrary to the Examiner's statement, however, one skilled in the art at the time the invention was made would not have had any apparent reason to combine the teachings of Parke and Turner in the proposed manner. The reason Parke fails to teach or suggest anything about "a remapper for mapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame" is not surprising because the low resolution frames and the high resolution frames that are computed in blocks 210 and 220, respectively, already are aligned spatially. In particular, as shown in FIG. 3, each of the high resolution images is computed from the same image data that is used to compute a corresponding one of the low resolution image frames (see, e.g., col. 6, lines 15-40; FIG. 3, steps 321, 322, 330, and 350). Consequently, the high resolution images (including the interpolated high resolution images described in col. 6, lines 48-52) and corresponding ones of the low resolution images necessarily are aligned spatially; there is no motion to be compensated. Thus, one skilled in the art at the time the invention was made would not have had any apparent reason to combine the teachings of Parke and Turner in the

manner proposed by the Examiner because such a modification of Parke's teachings would not have served any useful purpose whatsoever.

For at least this additional reason, the rejection of claim 1 under 35 U.S.C. § 103(a) over Parke and Turner should be withdrawn.

2. Claims 3-5

Each of claims 3-5 incorporates the features of independent claim 1 and therefore is patentable over Parke and Turner for at least the same reasons explained above.

3. Claim 10

Independent claim 10 recites elements that essentially track the elements of claim 1 discussed above. Therefore, claim 10 is patentable over Parke and Turner for at least the same reasons explained above in connection with claim 1.

4. Claim 12-14

Each of claims 12-14 incorporates the features of independent claim 10 and therefore is patentable over Parke and Turner for at least the same reasons explained above.

B. Claims 2 and 11

The Examiner has rejected claims 2 and 11 under 35 U.S.C. § 103(a) over Parke (U.S. 5,025,394) in view of Turner (U.S. 6,198,505) and Burt (U.S. 5,649,032).

Claim 2 incorporates the elements of independent claim 1. Burt does not make-up for the failure of Parke and Turner to teach or suggest the features of independent claim 1 discussed above. Therefore, claim 2 is patentable over Parke, Turner, and Burt for at least the same reasons explained above in connection with claim 1.

Claim 11 incorporates the elements of independent claim 10. Burt does not make-up for the failure of Parke and Turner to teach or suggest the features of independent claim 10 discussed above. Therefore, claim 11 is patentable over Parke, Turner, and Burt for at least the same reasons explained above in connection with claim 10.

C. Claims 6 and 15

The Examiner has rejected claims 6 and 15 under 35 U.S.C. § 103(a) over Parke (U.S. 5,025,394) in view of Turner (U.S. 6,198,505) and Griessl (U.S. 6,370,196).

Claim 6 incorporates the elements of independent claim 1. Griessl does not make-up for the failure of Parke and Turner to teach or suggest the features of independent claim 1 discussed above. Therefore, claim 6 is patentable over Parke, Turner, and Griessl for at least the same reasons explained above in connection with claim 1.

Claim 15 incorporates the elements of independent claim 10. Griessl does not make-up for the failure of Parke and Turner to teach or suggest the features of independent claim 10 discussed above. Therefore, claim 15 is patentable over Parke, Turner, and Griessl for at least the same reasons explained above in connection with claim 1.


VI. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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